

Applic. No. 10/022,226

Amdt. dated December 14, 2004

Reply to Office action of September 14, 2004

Remarks/Arguments:

Reconsideration of the application is requested.

Claims 1-47 remain in the application. Claim 42 has been amended. Claim 43 has been cancelled. Claims 15-40 have been withdrawn from consideration.

In the fourth paragraph on page 2 of the above-identified Office action, claims 1-2, 4-5, 7-9, 11-12, 14, and 41 have been rejected as being fully anticipated by Nolan et al. (U.S.

Patent No. 5,508,228) (hereinafter "Nolan") under 35 U.S.C. § 102.

As will be explained below, it is believed that the claims were patentable over the cited art in their original form and the claims have, therefore, not been amended to overcome the references.

Before discussing the prior art in detail, it is believed that a brief review of the invention as claimed, would be helpful.

Claim 1 calls for, *inter alia*:

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the at least one elevation having a geometrical shape for achieving a spring effect in directions extending parallel to the first surface.

In the present invention, the difference in thermal expansion coefficient, for example between a semiconductor chip and a substrate, is more effectively compensated by providing contacts which have a spring effect in a plane that is parallel to the surface of the electronic component. As will be explained below, the Nolan reference addresses a different technical problem and discloses contacts, which have a completely different effect.

The Nolan reference discloses contacts (10), which "solve the z-axis movement problem" (column 16, lines 10-16). Nolan discloses a contact, which is compliantly compressible up to 85% of its original height (column 5, lines 39-49 and Figs. 3 and 4). Nolan discloses that the contacts adjust for warp or non-planarity in the substrate and for the wire bond pad height non-uniformities (column 2, lines 56-60). Accordingly, Nolan discloses a contact for achieving a spring effect in directions that are orthogonal to the surface of the component.

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The reference does not show the at least one elevation having a geometrical shape for achieving a spring effect in directions extending parallel to the first surface, as recited in claim 1 of the instant application. The Nolan reference discloses contacts having a geometrical shape for achieving a spring effect in directions, which are orthogonal to the surface of a component. The Nolan reference does not disclose a contact having a geometry for achieving a spring effect in directions that are parallel to the surface of the component. This is contrary to the invention of the instant application as claimed, in which the at least one elevation has a geometrical shape for achieving a spring effect in directions extending parallel to the first surface.

Since claim 1 is believed to be allowable, dependent claims 2, 4-5, and 7 are believed to be allowable as well.

Even though claim 1 is believed to be allowable, the following remarks pertain to the non-obviousness of claim 1.

There is no hint or suggestion in the Nolan reference to provide an elevation, which has a spring effect in directions extending parallel to the surface of the electronic component. Nolan gives no indication that it is desirable to provide a component in which the contacts have spring effect in

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directions extending parallel to the surface of the electronic component. Nolan does not disclose that a spring effect in directions that extend parallel to the surface of the electronic component can be provided by a contact with an appropriate geometrical shape.

Claim 8 calls for, *inter alia*:

a conduction path disposed in the interior of the elevation between the at least one of the electrical contacts and the electronic circuit.

The Nolan reference discloses a conducting coating having two layers (40 and 44) disposed on the outer surface of the polymer bump (24) (Fig. 5i). The layer (40) of Nolan is disposed on the surface of the polymer bump (24).

The reference does not show a conduction path disposed in the interior of the elevation between the at least one of the electrical contacts and the electronic circuit, as recited in claim 8 of the instant application. The Nolan reference discloses a conducting layer (40) disposed on the surface of the polymer bump (24). The Nolan reference does not disclose a conduction path in the interior of the polymer bump (24). This is contrary to the invention of the instant application

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as claimed, in which a conduction path is disposed in the interior of the elevation between the at least one of the electrical contacts and the electronic circuit.

Since claim 8 is believed to be allowable, dependent claims 9, 11, 12, and 14 are believed to be allowable as well.

Even though claim 8 is believed to be allowable, the following remarks pertain to the non-obviousness of claim 8.

There is no suggestion or indication in Nolan that would motivate a person of ordinary skill in the art to dispose a conduction path in the interior of an insulating elevation.

In the last paragraph on page 4 of the Office action, claims 3 and 10 have been rejected as being obvious over Nolan (U.S.

Patent No. 5,508,228) in view of Chen et al. (U.S. Patent No.

5,910,687) (hereinafter "Chen") under 35 U.S.C. § 103. Chen does not make up for the deficiencies of Nolan. Since claim 1 and 8 are believed to be allowable, dependent claims 3 and 10 are believed to be allowable as well.

In the second paragraph on page 5 of the Office action, claims 6 and 13 have been rejected as being obvious over Nolan (U.S. Patent No. 5,508,228) in view of Lee et al. (U.S. Patent No.

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6,140,456) (hereinafter "Lee") under 35 U.S.C. § 103. Lee does not make up for the deficiencies of Nolan. Since claim 1 and 8 are believed to be allowable, dependent claims 6 and 13 are believed to be allowable as well.

In the last paragraph on page 5 of the Office action, claims 42 and 43 have been rejected as being obvious over Nolan (U.S. Patent No. 5,508,228) in view of Yoshifumi (JP 1-187948) under 35 U.S.C. § 103.

The rejection has been noted and the claims have been amended in an effort to even more clearly define the invention of the instant application. The claims are patentable for the reasons set forth below. Support for the changes is found on page 21, line 25 to page 22, line 5 of the specification and in claim 43 of the instant application.

Claim 42 calls for, *inter alia*:

an insulation layer only partially covering the at least one insulating elevation by leaving the side face free of the insulation layer.

The Yoshifumi reference discloses an electrically conducting columnar electrode contact (7), which is surrounded on all

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sides by a resin coating (5b). It is applicants' position based on Fig. 1 of Yoshifumi, that the electrically insulating resin coating (5b) provides a through hole into which the columnar electrically conducting electrode (7) is deposited.

It is a requirement for a *prima facie* case of obviousness, that the prior art references must teach or suggest all the claim limitations.

The references do not show or suggest an insulation layer only partially covering the at least one insulating elevation by leaving the side face free of the insulation layer, as recited in claim 1 of the instant application.

The references applied by the Examiner do not teach or suggest all the claim limitations. Therefore, it is believed that the Examiner has not produced a *prima facie* case of obviousness.

In the last paragraph on page 6 of the Office action, claim 44 has been rejected as being obvious over Nolan (U.S. Patent No. 5,508,228) in view of Yoshifumi (JP 1-187948) and further in view of Bunting et al. (U.S. Patent No. 3,641,254) (hereinafter "Bunting") under 35 U.S.C. § 103. Bunting does not make up for the deficiencies of Nolan and Yoshifumi.

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Since claim 42 is believed to be allowable, dependent claim 44 is believed to be allowable as well.

In the last paragraph on page 7 of the Office action, claim 45 has been rejected as being obvious over Nolan (U.S. Patent No. 5,508,228) in view of Bunting (U.S. Patent No. 3,641,254) under 35 U.S.C. § 103.

As will be explained below, it is believed that claim 45 was patentable over the cited art in its original form and claim 45 has, therefore, not been amended to overcome the references.

Applicants maintain that claim 45 is not obvious over Nolan in view of Bunting. The invention according to Bunting relates to a different technical area because Bunting discloses a substrate, whereas the present invention relates to an electronic circuit or semiconductor chip. Therefore, it is applicants' position that a person of ordinary skill in the art would not look to the teaching of Bunting when providing conduction paths on an electronic circuit.

Bunting teaches a substrate (47) formed on a leadframe (10) by a molding technique. The substrate (46) has a recess (52) for accommodating the chip and raised lines (54), which when they

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are metallized, form electrically conductive paths from the chip to the leadfingers (12) of the leadframe (10). Bunting discloses a method in which the whole surface of the substrate (46) is covered with photo-resist, which is removed by grinding away from the upper surface and the raised lines (54) (Fig. 6).

Therefore, the conductor tracks of Bunting are rather large, 0.003 in. wide leads with lands of 0.003 in. (column 3, line 40). Applicants believe that the metallization is thick because the surface is roughened by grinding.

In contrast to Bunting, the present invention according to claim 45 relates to conduction paths disposed on an electronic circuit. The conduction paths are located on the surface of the electronic circuit and on the surface of the elevation and provide an electrical connection between the electrical

contact and the electronic circuit. Accordingly, the conduction paths of the present invention are much smaller and the surface roughness of the roughened regions is much smaller than those produced by the grinding technique of Bunting.

Therefore, based on the above-given comments, it is applicants' position that a person of ordinary skill in the art would not use the teaching of Bunting when providing

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conduction paths on the surface of an electronic circuit. As such, claim 45 is not obvious over Nolan in view of Bunting.

In the second paragraph on page 8 of the Office action, claims 46 and 47 have been rejected as being obvious over Nolan (U.S. Patent No. 5,508,228) in view of Bunting (U.S. Patent No. 3,641,254) and further in view of Reetz et al. (U.S. Patent No. 6,309,798) (hereinafter "Reetz") under 35 U.S.C. § 103. Reetz does not make up for the deficiencies of Nolan and Bunting. Since claim 45 is believed to be allowable, dependent claims 46 and 47 are believed to be allowable as well.

It is accordingly believed to be clear that none of the references, whether taken alone or in any combination, either show or suggest the features of claims 1, 8, 42, or 45.

Claims 1, 8, 42, and 45 are, therefore, believed to be

patentable over the art and since all of the dependent claims are ultimately dependent on claim 1, 8, 42, or 45, they are believed to be patentable as well.

In view of the foregoing, reconsideration and allowance of claims 1-14 and 41-47 are solicited.

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In the event the Examiner should still find any of the claims to be unpatentable, counsel respectfully requests a telephone call so that, if possible, patentable language can be worked out.

If an extension of time for this paper is required, petition for extension is herewith made.

Please charge any other fees which might be due with respect to Sections 1.16 and 1.17 to the Deposit Account of Lerner & Greenberg P.A., No. 12-1099.

Respectfully submitted,



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